vessel, to meet with a still worse fate in the more tropical wastes of Central America.

Below Ensenada is a succession of small settlements striving to maintain a precarious existence, with an increased aridity of climate and more forbidding aspects of scenery. What may hereafter be developed in the way of mines and a limited agriculture will probably await political changes, or an invasion by that modern civilizer—the railroad. It seems not a little strange that such a narrow peninsula, indented by navigable bays and washed by ocean and gulf along such an extensive shore line, should be abandoned to hopeless sterility. The adventurous history of the early Spanish missions on this coast should throw some light on the true resources of the country, and the difficulties which they encountered from hostile tribes and uncertain supplies should be measurably overcome by our modern appliances of rapid transportation. Useless as it always has been to Mexico, either as a source of internal strength or civilized development, its present scant population would seem to invite its absorption into that progressive Union that is now planted so firmly on the Pacific Coast. Then, with beacon lights blazing along her rugged coast, her harbor marked out with buoys, her interior country and mineral resources developed from ocean to gulf, we might see something more than a skeleton finger resting useless on the placid bosom of the southern sea.

Occupied with such imaginings, your correspondent, after pacing the shores of the Bay of All Saints, returned by the inland route, through San Rafael, an elevated basin 2,500 feet above the sea level. Thence by an intolerably rough road, destitute of verdure and scantily supplied with water, we again fell into our previous outward track, and terminating our pleasant and succesful botanical trip by a refreshing bath in the Tiajuana hot spring, again found ourselves on American soil.

San Diego, April 22, 1882.

SOME POPULAR FALLACIES CONCERING CALIFORNIA REDWOOD.[1]

Emanuel Fritz

I doubt if there is a forest anywhere that receives so much public notice as our own California redwood forest. In their enthusiasm for the forest, however, many people have given their imagination so much freedom that some erroneous beliefs have developed. In the brief quarter-hour allotted to me, I can touch upon only a few of these fallacious beliefs. They are, the sizes of the trees, the age of the forest, the rate of growth of the trees and the influence of fires.

Sizes of the Trees.

So impressed are we apt to be with the huge size of individual trees, that we lose sight entirely of the greater number of smaller ones. A stranger may very easily be led to believe that the large trees predominate, and that small trees are in the minority, if present

[1] Read at the annual meeting of the Society on Feb. 23, 1929.

at all. Lumbermen themselves see only the big trees and pay little attention to the small ones. In fact, if a tree is not 24 inches in diameter, it is likely to be considered too small for profitable handling. In certain other forest regions, however, 24 inch trees would be considered of good size. Redwood trees do, of course, reach great proportions. The largest I have ever measured myself were a little over 16 feet in diameter, but these same trees locally are reputed to be 22 to 23 feet in diameter, because the layman measures the diameter of the tree at the ground line, whereas the forester does not credit the tree with the immense flare or swell of the stump portion and consequently he measures above it or at "breast height", which is 4½ feet from the ground. A reliable observer told me recently of a tree 20 feet in diameter at "breast height", and doubtless there are more of such great diameter scattered here and there. Trees over 10 feet in diameter are really rather rare and are found only on river benches or scattered lightly elsewhere. During the past year, I had occasion to measure the trees on a 30 acre tract. This tract was typical and probably a good average of the Humboldt County redwood timber. The classification of the "breast-high" diameters of the trees on this tract gives the following data. Trees over 12 inches in diameter, 1263. Of this number, 18.9% are 61 inches or more in diameter, and 34.5% vary from 31 to 60 inches. 51.6% vary from 12 to 30 inches. Below 12 inches there are as many more trees as there are above that diameter. Those under 12 inches were not counted, but there are certainly much more than a thousand. You will see, therefore, that the giant trees are far outnumbered by the smaller ones. From a forester's point of view, it is important to know the relative abundance of each diameter class. In fact, the lumberman is interested in this also, although he can make a profit only from the larger trees.

Age of the Redwood Forest.

It is often said that the redwood forest is "thousands" of years old. The layman may thus come to believe that most of the trees in the redwood forest exceed several thousand years. I doubt, however, if there are very many trees over 2000 years old. The oldest tree of which I saw a cross section myself, was just under 2000 years old. This, of course, is not the age of the forest, but only the age of that individual tree. Such patriarchs, just like trees of large diameter, are very much in the minority. Incidentally, the largest trees are not necessarily the oldest, because there is a big difference in the rate of growth of individuals. Most redwood trees are much younger. I feel safe in saying that the bulk of them are under 600 years of age. I have often heard the redwood forest spoken of as being overmature, and some have even described it as being even-aged. Nothing is farther from the fact. There is not a forest in all the world in which there is such an inequality of ages and where

there are so many vigorously growing trees as contrasted to decadent trees. I venture the statement that if you find a 2000 year old tree, you will find on the same 40 acres, trees of many more ages down to very young seedlings. On the 30 acre plot already mentioned, we found a single tree which attained an age of 1380 years. The next oldest was aged 1246. These ages were all obtained at the stump and are therefore slightly less than the total age. We did not obtain the ages of all the many trees on this area because of burned-out centers, rot and other factors; also because very few of the many trees under 18 inches in diameter were cut down. Of the 567 trees on this little area whose ages were actually determined and whose diameter was over 18 inches, only 17 were found to be over 1000 years old. Tabulating the ages gives the following results:

0— 200	years—	unknown
201— 300	years—	108 trees
301— 400	years—	89 trees
401— 500	years—	81 trees
501— 600	years—	102 trees
601— 700	years—	67 trees
701— 800	years—	38 trees
801— 900	years—	34 trees
901—1000	years—	31 trees
1001 and over	—	17 trees

I purposely left off the ages of the 1 to 200 year old class, because only a few trees under 18 inches in diameter were cut. If these had been included, there would be more than a thousand trees in this class. It is obvious from this that the redwood forest is very uneven-aged, that as a forest it is not over-mature, and that the ages of the individual trees vary widely from under 100 years to over 1000 years.

Rate of Growth.

You often hear it said that the redwood is a slow grower. In fact, when the forestry school first became interested in redwood forestry, the idea of replanting cut-over lands with redwood was laughed at by many of the local residents. It is common knowledge now that this species is really a very rapid grower if it is given a chance. In the virgin forest, of course, the trees have all kinds of competition. Their individual growth is, therefore, very slow—it might take 50 years or more to add an inch of wood. Without this competition, as would be the case in a well managed young forest, that same inch may require only three years. Virgin trees that have been dragging along for 400 years making only slow growth because crowded by neighbors may. if these neighbors are removed, suddenly change their rate of growth from extremely slow to extremely fast as is evidenced by the sample I have here. Thus, if redwood grows slowly, it is not the fault of the species but the fault of its environment.

The Influence of Fire.

How many times have those of you who have talked to old-timers in the redwood region, been told that fire doesn't hurt the redwood.

I have been told many times that fire is good for the redwood and that it actually stimulates their growth! Another fallacy. Fire never helped any forest permanently. Fires have run through the redwoods for centuries. On the 30 acre tract which we studied last year, we dated some fires back to the year 843, nearly 1100 years ago, and the scars as revealed on the stumps show there were dozens of additional fires since then, possibly two or three bad ones each century. Were it not for the fires of the past, the average tree would certainly be larger, and there would be probably 15% more timber—in fact you can say that fires of the past plus the ensuing heart rot have caused just that much loss to the lumberman. It is a peculiarity of redwood that it has no tree-killing insect or fungus enemies of any consequence, but fire is a real enemy. Just because a fire sweeping through a virgin forest does not lay low the entire stand, is not proof that great damage has not been done. On the 30 acre area which I have already described, we had a fire after we started our work, and although it did not burn through the entire 30 acres, it brought down 8 large trees. Fire, also, is the direct cause of most of the rather prevalent heart rot which causes so much loss of good lumber, to say nothing of the large holes burned into the butts of the trees, known locally as "goosepens". I hope I have impressed you with the fact that fire is a genuine enemy of the redwood forest and should therefore be kept out.

THE SANTA BARBARA MUSEUM OF NATURAL HISTORY

Ralph Hoffman

The Santa Barbara Museum of Natural History is an outgrowth of The Museum of Comparative Oology, which was founded in 1916 by W. Leon Dawson. In 1922, Mr. Dawson resigned as director, and, early in 1923, the Museum broadened its scope and began to exhibit birds, mammals, insects and flowers. In 1924, a department of archaeology was added. The trustees and the director of the Santa Barbara Museum have chosen to confine its exhibits and collections almost wholly to the local field, believing that a restricted field would give the Museum a wide enough scope and make it of the greatest value to the community. Before the Museum had any definite space for botanical exhibits, it put on each spring a wild flower exhibit in the patio. In 1927, Mrs. Clinton B. Hale gave a wing for botany and made provision for continuous shows of both native and exotic flowers. The wing was given in memory of Mr. Clinton B. Hale, who was particularly interested in growing rare trees and shrubs in Santa Barbara. The director began, in 1927, the collection of material for herbaria both of native and exotic plants. At the close of 1928, these herbaria included over 5000 sheets of native plants and over 3000 sheets of exotics.

[1] The introduction work of this pioneer plantsman is well described by Wilson Popenoe (Jour. Hered. 13:215) under the name of Dr. E. O. Fenzi, but with a reference to the name Franceschi. By this name the Doctor was universally known in California and under it was issued his catalogs of exotic plants.—W. L. J.